Ken Amamori
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CS 4375

Sockets Assignment 4 Report

Walkthrough Code:

First set socket to setblocking(false) in order to make it non-blocking socket. To accomplish non-blocking socket, use select.select method and provide three list with time out. Need to provide timeout since without it, it might function as if it is blocking socket. Three list are; 1. List of any socket that inputs might come, 2. List of any sockets that current socket can write to, and 3. Any error handling.

```
ready_to_read, ready_to_write, in_error = \
        select.select(
           potential_readers,
           potential_writers,
           potential_errs,
           timeout)
```

Code from https://python.readthedocs.io/en/latest/howto/sockets.html.

Select.select() retuns any iterative items for each actions, read, write and errors. Every second (if timeout = 1), it will ask for any potential connection regards read, write, errors to the OS. If found, the program will iterate each potential sockets with related action. When there is any w (writable socket), get user input and send to server side. When r (readable) exist, receive data from that socket. When error occurs, notify the user and removes all sockets. In this lab, in order to accomplish receive from the server, display and user input answer, send the answer to the server, and response to the answer, I changed the value of outputs and inputs (value provided to select()). When the socket reads anything, it will append to outputs, when the socket writes anything, it will append to inputs. This way, response and answer will take turn between client and server. When there is any inputs list, that means that client is waiting for response from the server. Thus, I added timer (counter) to keep track of how many seconds have elapsed.

Code:

Client:

```
#!/usr/bin/env python3
from socket import *
import select
from datetime import datetime

s = socket(AF_INET, SOCK_STREAM)
s.connect(("127.0.0.1", 7069))
s.setblocking(False)
```

```
inputs = [s]
outputs = []
timer = 0
while 1:

    if inputs:
        timer += 1
        print("Client:\tat %s waiting for response, %d second has elapsed" %
(datetime.now().strftime("%H:%M:%S"), timer))

    try:
        r, w, e = select.select(inputs, outputs, inputs, 1)
    except:
        print("Exiting...")
        break

    for s in w:
        i = input("Client:\t")
        data = s.send(i.encode())
        print("Client:\tsent to server at %s" % datetime.now().strftime("%H:%M:%S"))
        outputs.remove(s)
        inputs.append(s)

    for s in r:
        data = s.recv(10000).decode()
        if data == "e":
            s.close()
            break
        print("Client:\tserver replied at %s:" % datetime.now().strftime("%H:%M:%S"))
        print("%s" % data)
        inputs.remove(s)
        outputs.append(s)
        timer = 0

    for s in e:
        print(f'Non Blocking - error')
        inputs.remove(s)
        outputs.remove(s)
        break
```

```
s.close()
```

Server:

```
#!/usr/bin/env python3
from socket import *
import time
import random
s = socket(AF_INET, SOCK_STREAM)
s.bind(("127.0.0.1", 7069))
s.listen(5)
c,a = s.accept()
counter = 0
while True:
    if counter != 0:
        time.sleep(int(4*random.random()))
    if counter == 0:
        c.send("System:\tHello, welcome to chatbot program. \nSystem:\tAre you importing messages from file?
\nSystem:\tEnter only either \"yes\" or \"no\".".encode())
        counter += 1
    elif counter == 1:
        if data == "yes":
            c.send("System:\tImport file but currently not available. \nSystem:\tHello, are you male or
female?".encode())
            counter += 1
        elif data == "no":
            c.send("System:\tHello, are you male or female?".encode())
            counter += 1
        else:
            c.send("System:\tPlease enter in the correct format ... \n".encode())
    elif counter == 2:
        if data == "female":
            c.send("System:\tHow excellent! \nSystem:\tAre you a CS major?".encode())
```

```
        elif data == "male":
            c.send("System:\tMe too. \nSystem:\tAre you CS major?".encode())
        else:
            c.send("System:\tGreat! \nSystem:\tAnyways, are you CS major?".encode())
        counter += 1
    elif counter == 3:
        if data == "no":
            c.send("System:\tToo bad. \nSystem:\tAnyway, what's an animal you like, and two you don't?".encode())
        elif data == "yes":
            c.send("System:\tExcellent, I am too. \nSystem:\tWhat's an animal you don't like, and two you
don't?".encode())
        else:
            c.send("System:\tCool! \nSystem:\tBy the way, what's an animal you like, and two you don't?".encode())
        counter += 1
    elif counter == 4:
        data1 = data.split(',')
        msg = "System:\t%s awesome, but i hate %s too. \nSystem:\tBye for now. \n***Enter \'e\' to exit program." %
(data1[0].strip(), data1[-1].strip())
        c.send(msg.encode())
        counter += 1
    else:
        c.send(''.encode())
    data = c.recv(1000).decode().strip()
    if data == "e":
        print("Exiting...")
        c.send("e".encode())
        c.close()
        break
c.close()
```

Output:

1st example

Kens-MBP:sockets_assignment4 ken$ python3 client.py
Client: at 10:17:37 waiting for response, 1 second has elapsed
Client: server replied at 10:17:37:
System: Hello, welcome to chatbot program.

System: Are you importing messages from file?
System: Enter only either "yes" or "no".
Client: yes
Client: sent to server at 10:17:41
Client: at 10:17:41 waiting for response, 1 second has elapsed
Client: server replied at 10:17:41:
System: Import file but currently not available.
System: Hello, are you male or female?
Client: male
Client: sent to server at 10:17:42
Client: at 10:17:42 waiting for response, 1 second has elapsed
Client: server replied at 10:17:42:
System: Me too.
System: Are you CS major?
Client: no
Client: sent to server at 10:17:43
Client: at 10:17:43 waiting for response, 1 second has elapsed
Client: at 10:17:44 waiting for response, 2 second has elapsed
Client: server replied at 10:17:45:
System: Too bad.
System: Anyway, what's an animal you like, and two you don't?
Client: cat, dog
Client: sent to server at 10:17:49
Client: at 10:17:49 waiting for response, 1 second has elapsed
Client: at 10:17:50 waiting for response, 2 second has elapsed
Client: server replied at 10:17:50:
System: cat awesome, but i hate dog too.
System: Bye for now.
***Enter 'e' to exit program.
Client: e
Client: sent to server at 10:17:54
Client: at 10:17:54 waiting for response, 1 second has elapsed
Client: at 10:17:54 waiting for response, 2 second has elapsed
Exiting...

2nd example:
Kens-MBP:sockets_assignment4 ken$ python3 client.py
Client: at 10:18:36 waiting for response, 1 second has elapsed
Client: server replied at 10:18:36:
System: Hello, welcome to chatbot program.
System: Are you importing messages from file?
System: Enter only either "yes" or "no".
Client: no
Client: sent to server at 10:18:38
Client: at 10:18:38 waiting for response, 1 second has elapsed
Client: at 10:18:39 waiting for response, 2 second has elapsed
Client: at 10:18:40 waiting for response, 3 second has elapsed
Client: server replied at 10:18:41:
System: Hello, are you male or female?
Client: female
Client: sent to server at 10:18:43

Client: at 10:18:43 waiting for response, 1 second has elapsed
Client: server replied at 10:18:43:
System: How excellent!
System: Are you a CS major?
Client: no
Client: sent to server at 10:18:45
Client: at 10:18:45 waiting for response, 1 second has elapsed
Client: at 10:18:46 waiting for response, 2 second has elapsed
Client: at 10:18:47 waiting for response, 3 second has elapsed
Client: server replied at 10:18:48:
System: Too bad.
System: Anyway, what's an animal you like, and two you don't?
Client: dog,cat
Client: sent to server at 10:18:52
Client: at 10:18:52 waiting for response, 1 second has elapsed
Client: at 10:18:53 waiting for response, 2 second has elapsed
Client: at 10:18:54 waiting for response, 3 second has elapsed
Client: at 10:18:55 waiting for response, 4 second has elapsed
Client: server replied at 10:18:55:
System: dog awesome, but i hate cat too.
System: Bye for now.
***Enter 'e' to exit program.
Client: e
Client: sent to server at 10:18:56
Client: at 10:18:56 waiting for response, 1 second has elapsed
Client: at 10:18:56 waiting for response, 2 second has elapsed
Exiting...